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nation and rose with a quivering flame-like motion almost to the zenith where they disappeared, to be succeeded by others in turn. These waves appeared to be about 10° to 30° in a horizontal direction and perhaps 2° in the vertical direction. The display was observed by us until about ten and we were told by a fisherman who was out all night that it lasted until nearly three in the morning.

On August 25, at Clinton, Conn. (Lat. $41^{\circ} 17'$), we observed a still more brilliant display at 8.40. There was an arch of greenish-white light whose center bore nearly north, true, the portion of sky enclosed by the luminous arch being entirely dark. Streamers of considerable intensity were observed and the light from the arch was sufficient to illuminate the whole bay, rendering objects 300 yards away distinctly visible. At times above the greenish-white light, light varying from pale pink to deep red was observed, but chiefly on the eastern side of the meridian and high up, at least 75° . Suspecting that the latter phenomenon might be an illusion due to a complementary after-image of the brighter display lower down, we examined it carefully with the light from the rest of the display cut off for a considerable time but could not see that this made any difference. The display was observed until 9.40, when it had not ceased.

Are not these phenomena, *i. e.*, the dark segment below the bright arch and the pink color, unusual in such low latitudes?

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SCIENTIFIC BOOKS

Experimental Pharmacology. By DENNIS E. JACKSON, Ph.D., M.D., Associate Professor of Pharmacology, Washington University Medical School, St. Louis. St. Louis, C. V. Mosby Company. 1917. Pp. 536, with 390 illustrations. Cloth. Price \$4.

Scientific text-books may be conveniently grouped into two classes: the majority have for their object the adequate, concise and clear presentation of the principal facts and data concerning the subject they deal with, in

logical order and with a due regard to their relative importance. Such works are generally impersonal in character and introduce the author's views only incidentally in connection with the sections dealing with the particular lines of work in which they have been interested. Another class of text-books, however, may be characterized as distinctly "individualistic" in style and seem to have for their purpose primarily the exposition of the author's methods and views, relegating all other matter to a secondary place. Such a presentation of the subject is perhaps a natural one for the pioneer in a new domain of science and may be exemplified in case of pharmacology by Schmiedeberg's well-known little book, but when a science has once reached a high development, as is true of the pharmacology of the present day, this form of treatment in any hands but those of a great master is apt to become somewhat one-sided and provincial.

Within the last few months we have seen the publication in this country of two text-books on pharmacology which well exemplify the two classes just mentioned. Sollmann's "Manual of Pharmacology and Laboratory Guide"—the recent new edition of his older work, greatly amplified, revised and rearranged—is an excellent example of scientific exposition belonging to the first or "impersonal" class.

Jackson's "Experimental Pharmacology," on the other hand, is certainly "individualistic" in character, and must be put in the second class described above. It is not an ordinary "text-book" of pharmacology but is preeminently Jackson's text-book of pharmacology. The personality of the author is patent on almost every page of it; and therein are expressed both the merits and the demerits of the work. On the one hand, even a superficial examination of the treatise reveals, as is well known, that the author is a master of technique and the descriptions of various devices and experiments originated or improved by him are, in so far as they are new, illuminating and useful. On the other hand, the author unfortunately, in exactly the same manner as he treats new and original manipula-

tions, also expatiates upon non-essentials and indiscriminately devotes a great deal of valuable space to detailed and minute descriptions of ordinary experiments well known to every physiologist and pharmacologist, conveying the impression as if the methods taught by the St. Louis school were the only and the best.

The mass of unimportant details which are crowded into the book is surprising and it is doubtful whether they will prove profitable even to the student. It is a truism that no experimental science can be learned from a text-book and it is inherent in the nature of experimental investigation that subordinate details of various procedures have to be modified under various circumstances and conditions. It is very doubtful, therefore, whether pages of detailed description of *every* step in a given experiment may lead to a better grasp of its general features. Indeed, such didacticism may endanger the principal purpose of the exercise by diverting the student's attention from the main features of the problem. Many minutiae should be best left to the common sense of the experimenter, and will be learned by the beginner on the first day he spends in the laboratory. A single demonstration in the lecture room or the workshop will teach the student more than a hundred pages of detailed description. For this reason long descriptions with illustrations of how to tie an animal on the operating table and similar incidental and trite matters seem to us trivial and entirely superfluous. Such directions might possibly be found useful by a self-made pharmacologist on an isolated island—a Robinson Crusoe with pharmacological tendencies—with no one to guide him, but are needless and purposeless in a country where good teachers are to be found and well-equipped laboratories are accessible.

The title "Experimental Pharmacology" as applied to the present work seems to one familiar with pharmacological text-books to be somewhat misleading. One unconsciously expects to find a work along the lines of the "Experimentelle Pharmakologie" of Meyer and Gottlieb, namely, a logical presentation of important pharmacological facts based upon

the best modern experimental data. Jackson's book is in reality a laboratory manual which aims to present pharmacological deductions in connection with typical experiments described by the author. This fact explains best the rather one-sided character of the work, for in presenting the subject the author has laid the greatest stress upon the experiments in which he is an adept, and along the lines in which he has been personally interested. Thus, for instance, the whole group of heavy metals (iron, mercury, arsenic, etc.) is practically untouched in the text-book: they are not even mentioned in the index. On the other hand, the comparatively unimportant minor element or metal, vanadium, with which the author has done some work, receives considerably more attention than it deserves.

An extraordinary feature of Jackson's "Pharmacology" is its wealth of illustrations. The book is listed to contain 536 pages, including 390 illustrations. As many of the cuts are full-page, the drawings occupy about half of the book. Some of these are well executed and should prove extremely useful. This is especially the case with the reproductions of careful and complicated dissections and various schematic illustrations of nerves, blood vessels and other structures with which the book abounds. Furthermore, the drawings of new and original methods for studying circulation, pulmonary pressure, anesthesia, etc., will also be found of help. The diagram of the involuntary nervous system (p. 385), however, is not as lucid and explicit as that of Langley or the modifications of the latter to be found in Meyer and Gottlieb's "Pharmacology." A large number of kymographic tracings are also a distinctive feature of the book, but here again the author's personality is perhaps unduly accentuated by their selection. Thus we have noted some twenty or more tracings scattered promiscuously throughout the book, which illustrate broncho-constriction and broncho-dilatation, a method of experimentation for which the author has become well known. While many of the illustrations are well chosen and instructive, a large number may be found interspersed among them

which we deem entirely superfluous. We fail to discern the purpose served by pictures of a "graduated cylinder," a "beaker," a "burette and rubber tubing," a "specimen jar," "small wooden tables," a "casserole," a "scalpel," a "hemostat," an "evaporating dish," or of clamps, forceps, screws, scissors, oxygen tanks, hand bellows, bottles for holding stock solutions, and similar common utensils with which every student and laboratory boy becomes familiar as soon as he enters the class-room. Such illustrations could be obtained at a much less expense, if need be, from any laboratory supply dealer; by writing for an illustrated catalogue.

Barring the unnecessary mass of subordinate detail in the text and illustrations, Jackson's treatise has certain admirable features. The style of the author bespeaks his intense earnestness of purpose and interest in the subject. The descriptions of his original or improved methods are often admirable and illuminating. A number of experiments are described which are not found in the ordinary text-book. Among these may be mentioned especially experiments on the eyes, intratracheal insufflation, elaborate and newer methods of anesthesia, oncometric and other experiments on the spleen and other organs, methods for the study of esophageal, vesical and uterine contractions, and the author's *chef d'oeuvre*—his ingenious methods of studying pulmonary conditions, namely, pulmonary circulation, pulmonary pressure, and the contractions of bronchioles. Altogether, Jackson's "Pharmacology" is a unique and interesting work and will be found helpful by the pharmacologist, especially in the execution of some particular kind of work.

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APHIS IMMUNITY OF TEOSINTE-CORN HYBRIDS

CERTAIN properties and functions are possessed by some plants and animals providing them exemption from disease. The use of the word disease as applied to plants is sometimes

restricted to bacterial and fungous parasitism and its effects. It is also sometimes applied to disorders brought about by various forms of malnutrition, including attacks by insects and other low forms of animal life.

When the favorable conditions of life are so seriously interfered with by any agency, so that the life of a part of a plant or of the whole plant is threatened, we recognize disease in that plant.

When a plant is able to repel such devastating forces, more or less completely, it is said to possess corresponding degrees of total immunity.

Plants and animals are also subject to depredatory attacks of small animal life, parasitic in nature, but not producing what is ordinarily conceded as organic disease. Certain individuals repel or resist such depredations and it seems proper to call this phenomenon immunity.

It is with a behavior belonging to the last-named category that this account is concerned. The appearance of an instance of total immunity of any kind in an economic plant or animal seems eligible to record, and especially when the immunizing factor is hereditary.

During the early summer of 1913 there were grown in a greenhouse four short rows of F_1 or first generation hybrid plants coming from seed produced by fecundating teosinte, *Eulclanea mexicana* with pollen of yellow dent corn, *Zea indentata*.¹ In the same bed, and immediately adjoining the hybrid rows, were grown one row of the parent strain of teosinte on the one side and four rows of the parent strain of corn on the other.

¹ Teosinte and corn are both members of the grass family, but are classed in different genera. They hybridize freely with each other, although the teosinte is decidedly grasslike in appearance producing small two-rowed fruiting spikes in marked contrast to ears of dent corn. The first hybrid generation is intermediate in structure between the two parents, but more nearly resembling the teosinte in tillering profusely and being tall, slender and foliaceous. The hybrid ears are also small, fitting rigidly into a cavity of an internode of the rachis which disjoints readily at maturity, but succeeding generations produce some larger fruiting spikes more like the dent-corn parent.